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COTTON

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FOREWORD

Cotton textile manufacturing is one of India's two or three most important nonagricultural industries. Domestically, it supplies almost all the fabric used by a population of nearly one-half billion people, while, in addition, export of textiles is a major source of foreign exchange. Large cotton imports are required every year, in spite of the country's cotton acreage—the largest in the world. In recent years the United States has been an important supplier of raw cotton, most of it under Public Law 480.

Since partition in 1947, the Government of India has initiated many schemes designed to stimulate the nation's agriculture, including cotton production. A stated objective of the present 5-year plan is greater output of both raw cotton and cotton textiles. However, serious problems must be solved before these objectives can be gained.

This study, which is based in part upon information gathered by the author while on a trip to India in late 1964, takes a close look at the nation's cotton and textile industry. This publication is another in the Foreign Agricultural Service's program of reporting on competitive agricultural developments in other countries.



R. C. Sherman
Director, Cotton Division

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COTTON

in

INDIA

by
Vernon L. Harness
Cotton Division

India, with more land under cotton than any other nation and with a population second only to Mainland China, has a striking potential for the production and use of cotton. However, for a variety of reasons, the country has been hard pressed for many years to approach the quantities of raw cotton and cotton textiles that have been needed. Sizable imports of raw cotton have been necessary to fill mill requirements, and the United States has been a major supplier.

The Indian Government has encouraged development in all phases of the cotton industry through its 5-year plans and through other programs. The 5-year plan that ends in 1971 calls for textile production of about 11 billion yards, nearly one-third larger than the 1964 level of 8.4 billion yards. In view of the gains in recent years, it seems reasonable to expect that a large part of the increase can be attained—provided adequate supplies of raw cotton are to be available and textile industry capacity increased as planned.

Nevertheless, it appears unlikely that domestic cotton production will rise enough to meet anticipated 1971 mill requirements—over 6.5 million bales plus

600,000 bales for extra mill consumption and raw cotton exports. (In this report, bales of cotton are 480 lb. net.) This would require a 40-percent increase over average production for the first half of this decade, at about 4.7 million bales. However, a relatively steady uptrend in both yields and production is to be expected.

In view of an anticipated rapid rise in domestic needs (caused by a rising population and a possible increase in per capita use), along with the probability of a slower increase in domestic cotton production, raw cotton imports will continue to be of great importance to India's industry. In fact, India's cotton import requirements may increase. On the other hand, it seems unlikely that for at least a few years India's foreign exchange reserves will increase to such an extent that all the nation's cotton purchases can be financed with hard currency, and it is expected that such purchases would have to be largely under special programs.

Exports of Indian textiles have fallen in recent years. At present, nearly 95 percent of all cotton textiles produced in India are used domestically. Although the Indian Government is likely to continue to encourage textile exports, foreign sales will face increasing competition in many of India's traditional markets.

A form of competition facing raw cotton in India over the next several years will certainly be use of man-made fibers. Although Indian production of manmade fibers still is small, it is nevertheless increasing rapidly; on the other hand, imports do not appear likely to rise. The replacement, therefore, of a substantial quantity of cotton fibers with manmades over the next several years is a distinct possibility in India, though not as likely as in many other major cotton consuming countries.

Table 1.—COTTON: Supply and distribution in India, 1955-64

Season ¹	Stocks August 1	Production ²	Imports	Total Supply	Consumption ³	Exports
	1,000 bales ⁴	1,000 bales ⁴	1,000 bales ⁴	1,000 bales ⁴	1,000 bales ⁴	1,000 bales ⁴
1955-----	2,400	3,835	524	6,759	4,272	552
1956-----	1,935	4,170	495	6,600	4,523	252
1957-----	1,825	4,425	349	6,599	4,347	227
1958-----	2,025	4,200	391	6,616	4,391	325
1959-----	1,900	3,325	731	5,956	4,429	187
1960-----	1,340	4,630	907	6,877	4,613	224
1961-----	2,040	4,075	669	6,784	4,931	253
1962-----	1,600	4,900	746	7,246	4,909	287
1963-----	2,050	5,200	556	7,806	5,225	231
1964 ⁵ -----	2,350	4,900	674	7,924	5,500	190

¹ Beginning August 1. ² Includes non-commercial. ³ Includes small quantities of destroyed and unaccounted-for cotton.

⁴ 480 pounds net. ⁵ Preliminary.

THE RAW COTTON INDUSTRY

Acreage and production

Cotton is grown on only a relatively small part of India's cultivated area of about 350 million acres. Cereals and pulses account for over 80 percent, cotton about 5 percent. Nevertheless, India devotes more land to cotton than any other country in the world. In fact, almost one-fourth of the world's land planted to cotton is in India. However, the country's yields are the lowest among the world's major cotton producing countries, which causes India to take fourth place in production.

After partition in 1947, India held most of the textile capacity, while much of the relatively high-yielding cotton acreage in the north went to Pakistan. In an effort to make up the loss, the Government of India encouraged the expansion of cotton acreage. By 1950-54, cotton area averaged 16.5 million acres, compared with about 11 million just after partition. By the second half of the 1950's, the area had risen further to an average 19.7 million acres. Since that time it has averaged about 19.3 million acres.

Like the area planted to cotton, the acreage of most other crops in India has increased. Much of this rise in acreage was made possible by expanded irrigation facilities and by the building of new roads into areas reclaimed from previously uncultivable land. Much credit must also be given to success in efforts to rid many northern areas in India of malaria, freeing farmers from disabling illness. Cotton has benefited particularly from building of additional irrigation facilities. Nearly 15 percent of the crop is now grown under irrigation.

In the decade that followed partition, increased acreage accounted for the rise in cotton production. During this period, yields remained relatively stable at less than 100 pounds of lint per acre in most years.

Table 2.—INDIAN COTTON: Area, lint yields, and production, average 1950-54 and annual 1955-64

Season ¹	Area	Yield	Production
	1,000 acres	Lb. per acre	1,000 bales ²
Average:			
1950-54-----	16,463	99	3,404
Annual:			
1955-----	19,978	92	3,835
1956-----	19,893	101	4,170
1957-----	19,996	106	4,425
1958-----	19,926	101	4,200
1959-----	18,804	85	3,325
1960-----	18,971	117	4,630
1961-----	19,074	103	4,075
1962-----	19,385	121	4,900
1963-----	19,569	128	5,200
1964 ³ -----	19,870	119	4,900

¹ Beginning August 1. ² 480 pounds net. ³ Preliminary.

However, in the past several years there has been some improvement in yields, though at a much slower rate than in most other major cotton producing countries. Indian yields averaged 118 pounds per acre in the 5-year period 1960-64, compared with a world average in 1964 of over 300 pounds. Even this small increase in Indian yields must be attributed to generally favorable growing conditions and to increased use of irrigation. However, some gain reflects use of improved planting seed and increasingly of more suitable cultural practices.

Cotton production in India has ranged from a little under 2 million bales in 1948 to the record 5.2 million in 1963. Preliminary figures indicate average annual production of 4.7 million in the period 1960-64. This is nearly one-fifth larger than the preceding 5-year average, and nearly two-fifths larger than average production in 1950-54. In terms of cotton production, India is surpassed only by the United States, USSR, and Communist China. However, in terms of competition with the United States in world cotton import markets, India ranks far down the list. India is a net importer of cotton, and most of the country's limited exports of raw cotton are composed of shipments of short, harsh cotton not directly competitive with U.S. cotton.

Major producing areas

North.—This area includes the States of Punjab, Rajasthan, and Uttar Pradesh. Cotton is one of the major crops in the first two, and much of India's exported cotton is grown here. A number of years ago, most of the varieties grown in the north were Asiatic, but development of irrigation facilities has encouraged the shifting of more than one-half of the cotton acreage to higher-yielding American Upland varieties.

Area, lint yields, and production in this area, from 1961 through 1964, were as follows:

Season	Area	Yield	Production
	1,000 acres	Lb./acre	1,000 bales
1961	2,220	195	902
1962	2,128	198	876
1963	2,473	248	1,280
1964	2,435	181	919

Over 90 percent of cotton in this area is grown under irrigation. Average yields are substantially higher than in other regions of India, a result largely of effects of irrigation and use of improved varieties.

Cotton is planted in April and May, and the major part is harvested in November and December. Summers are extremely hot, with temperatures often above 110°F. Winters are rather cool, with frosts a common

occurrence each year. Rainfall averages from 5 inches to 35 inches in various parts; most precipitation occurs during the July–September monsoon period.

On the whole, the soils have productive capacity; however, they generally lack organic matter and nitrogen.

In the northern area, cotton is normally grown in a rotation that includes wheat and sometimes gram (chickpeas), sugarcane, or crops for fodder or green manure. Cotton is relatively profitable, and in recent years the production of Upland varieties has been more profitable than production of Asiatic cotton. However, Upland varieties have been more susceptible to insects than Asiatic varieties. The major pests are the pink bollworm and the jassid.

Central.—The central region includes the States of Maharashtra and Madhya Pradesh. More than one-third of the nation's cotton acreage and production is in this area; and cotton is usually considered the most important cash crop. Area, lint yields, and production, from 1961 through 1964, were as follows:

Season	Area 1,000 acres	Yield Lb./acre	Production 1,000 bales
1961	8,480	73	1,291
1962	8,415	95	1,667
1963	8,384	108	1,889
1964	8,621	100	1,788

Although cotton acreage has remained relatively stable, rising yields under generally favorable growing conditions have swelled cotton production substantially in recent years in the central area.

Practically all of the cotton is raingrown. The region gets most of its precipitation from the monsoon that starts early in June and continues into September. Rainfall varies from 20 to 50 inches annually. Cotton is planted in June and July and harvested in November–January. Temperatures often exceed 110°F. in May and sometimes touch 40°F. in December and January.

The region is characterized by heavy, black soils that have a high moisture retention capacity under good management and that develop large cracks in hot, dry weather. However, the soils are frequently deficient in nitrogen, potash, and organic matter.

Cotton is commonly grown in rotation with jowar (grain sorghum), although wheat, peanuts, gram, or other crops may be rotated, as well. In some districts cotton is occasionally sown broadcast; and sometimes other crops are interplanted with cotton.

The spotted and pink bollworms and jassids are the major pests. Diseases are usually of minor importance, except in years of heavy and continuous precipitation.

The *West coast* is essentially a plain that extends inland from the Arabian Sea. Most of the cotton area has heavy, black soil that tends to hold water well but cracks in hot, dry weather.

West coast.—The State of Gujarat comprises this region. Area, lint yields, and production from 1961 through 1964 were as follows:

Season	Area 1,000 acres	Yield Lb./acre	Production 1,000 bales
1961	4,033	143	1,203
1962	4,249	180	1,590
1963	4,101	147	1,255
1964	4,200	156	1,364

Cotton is usually planted in June and harvested in February–April, with most of the varieties, grown in this region, requiring 7 to 9 months to mature. Temperatures normally range from 50°F. in December–January to 100°F. in April.

Rainfall averages from 40 to 60 inches annually, in various parts. Nearly one-third of this commonly falls in July, although the monsoon runs from June to October. Most cotton is raingrown, although a few well-irrigation systems are in use, and in addition some canal irrigation has been developed in recent years. For the most part, however, water from wells is too brackish for irrigation purposes.

Cotton is commonly rotated with jowar mixed with pulses (beans). Peanuts are often included, where the soil is suitable. In some districts, cotton is planted for two or three years and then rotated with another crop for one year.

Major cotton pests include the spotted and pink bollworms, thrips, jassids, and aphids. The common diseases found in this area are fusarium wilt, root rot, and bacterial blight.

South.—This region includes the States of Mysore, Andhra Pradesh, and Madras. For the most part, cotton is produced under rainfall conditions. However, some districts have considerable irrigated acreage. Average annual precipitation varies from 30 inches to more than 100 inches in various parts of this region. Some districts receive their heaviest rainfall during June, July, and August, while in other districts rainfall is heaviest in October and November. Also, some districts receive substantial rainfall during both monsoons.

Yields are lower than in the other major cotton regions. Area, lint yields, and production from 1961 through 1964 were as follows:

Season	Area 1,000 acres	Yield Lb./acre	Production 1,000 bales
1961	4,242	75	664
1962	4,485	81	755
1963	4,502	81	764
1964	4,498	87	817

Widely different rainfall patterns and soil types have contributed to the practice of growing cotton throughout most of the year in some part of the region. Nevertheless, much of the crop is marketed in the spring. Cotton is grown in rotation with several crops. Among

them are jowar, millet, peanuts, wheat, and beans. Part of the cotton crop is sown broadcast, and sometimes other crops are mixed with cotton.

Considerable damage to the cotton crop is caused by insects and disease. Spotted and pink bollworms cause the most damage while jassids, weevils, and aphids are serious problems in some districts. The most serious diseases include blackarm, root rot, fusarium wilt, and anthracnose.

Other regions.—Practically all of the cotton not included in the four major areas is grown in the eastern part of the nation in the States of Assam, Tripura, Orissa, Bihar, and West Bengal.

The only cotton of commercial importance is Camilla, grown mostly in the hilly areas of Assam and Tripura. This cotton is valued for its coarseness, high resilience, and low wax content. It is used mostly for mixing with wool, as absorbent cotton, and in the manufacture of upholstery and carpets. The remaining few thousand bales that are grown in the eastern part of India are used in local home industries.

Production practices

The Indian cotton farmer, first and foremost, must provide for his family's basic food requirements, and cotton cannot compete with land needed for this purpose. However, once these requirements have been met, cotton competes strongly for the remaining cropland. In many areas, cotton is grown in rotation with food crops. Frequently, other crops are planted in the same row with cotton, or rows of other crops may be planted in cotton fields. For several years, cotton prices have

been favorable compared with alternative crops, and most farmers think of cotton as a sure, cash crop.

A substantial part of the cropland is owned by farm operators. In contrast with the situation many years ago, absentee ownership of cotton land is not widespread. However, extreme pressure on the land from the rapidly expanding population has resulted in very small farms, many of which are fragmented into several tiny plots. About two-thirds of India's farmers cultivate less than 5 acres, and only 1 percent of the holdings are larger than 50 acres.

Cultural methods.—Most of India's cotton is raised through quite backward cultural practices; for one thing, present cultural practices are not generally suited to mechanization. An abundance of low-cost labor is available, with most of the small farms worked by members of joint families. In view of the propensity of each family to grow several crops, the area devoted to each of these on most farms is quite small.

Bullocks supply a substantial part of the power for farming and for rural transportation. In some areas camels and buffaloes are also widely used for these purposes. An estimated 34,000 tractors, only, were in use in 1961. Little use is made of tractor power in cotton farming, except in a few cases where they are used for deep plowing.

In most cases, animal power is used to plow the field with a metal-tipped wooden plow. The cottonseed is usually dropped in the furrow by hand. A relatively small part of the crop is broadcast. Farmers prefer wide spacing between rows and between plants or hills of plants along the row; as a result, plant populations average far below those found in most countries. This



Women and children pick cotton in an irrigated field, the Punjab. The northern area of India now grows about 90 percent of its cotton with the aid of irrigation.

method is favored by the farmers because they believe it conserves moisture and allows more light to reach each plant.

In India, cotton is generally planted in time to benefit from the annual rains. This means that cotton is growing somewhere in India throughout the year. Since it is planted and partly grown during the rainy season, the lack of sunlight is sometimes a serious problem.

In most areas, cotton is harvested during the dry season. All of the crop is picked by hand, and the pace is usually leisurely. The average quantity picked per person, per day, is probably between 40 and 60 pounds. Most harvesting is done by women and children. The cotton is usually picked from the burr and placed in a pocket formed from a part of the sari. When a small quantity has been picked, the cotton is piled on the ground. A part of the harvest is frequently given to the picker as payment.

Irrigation.—Less than 15 percent of the cotton land is irrigated, and about 40 percent of the total cotton acreage is located in regions where rainfall is usually adequate for cotton production. In some areas of assured rainfall, waterlogging is a serious problem. In many of the irrigated areas, the use of water is not carefully controlled, and in addition supplies are often insufficient. Some fields are irrigated only once a season. Canals are chiefly used, to supply a predominant part of the gravity water from reservoirs. Wells and tanks (ponds) are also important sources of irrigation water. Although an increasing number of power pumps is in use on irrigation wells, animal-powered water wheels and lifts are still widely used in some areas.

India has a huge potential for additional irrigation facilities. Only a relatively small part of the capacity is now being used. Much of the country's future agricultural requirements must come from expanded use of this resource. Also, more attention must be given to drainage problems related to irrigation. Particularly in the north, sizable land areas in cotton and other crops have been adversely affected by the serious buildup in undesirable salts. Yields have been sharply reduced; and in some cases, fields have been taken out of production.

Fertilizer.—Soils in India are generally low in fertility. Nevertheless, as is true for most crops, very little organic fertilizer is used in the production of cotton. Organic fertilizers are used in some areas of India to maintain soil fertility; but in many areas, the common practice is to use crop residue in other ways. Even in the case of animal manure, its use for fertilizer is a poor second to its use for fuel.

A considerable expansion has taken place in use of chemical fertilizers in India during the past decade, although per acre use is still extremely low. Estimates for 1960–61 indicate that an average 2.4 pounds of nutrients were applied per acre of agricultural land. The comparable figure for the United States was about 62 pounds per acre on the area sown in 1963.

Considerable attention has been given to this problem, in official circles, but a solution is made more difficult by the scarcity of some chemical elements needed to manufacture fertilizer domestically, and by reluctance to commit the foreign exchange needed to import fertilizer. About one-half of the nitrogen and all of the potassium fertilizers used are now imported:

Type	1952 ¹ Mil. lbs.	1962 ¹ Mil. lbs.
Nitrogenous fertilizer in terms of nitrogen:		
Production	117	428
Imports	98	506
Total	215	934
Phosphatic fertilizer in terms of P ₂ O ₅ :		
Production	16	195
Imports	0	17
Total	16	212
Potassium fertilizer in terms of K ₂ O ²		
	7	98

¹ Year beginning April 1.

² All imported.

Pest and disease control.—Except for the boll weevil and cotton leafworm, the Indian cotton farmer must combat all of the pests and disease that trouble American producers. In addition, there are a number of pests in India that are not found in America. Although the problem is not as great as for many food and feed crops, cotton fields are often damaged by uncontrolled cattle and wild animals. Even elephants may trample fields in the far eastern regions.

The most serious insect pest of upland cotton in India that is not found in America is the jassid (*Empoasca devastans*). Unless a complete control program is followed, this leaf-sucking pest will virtually prohibit growth of cotton varieties that lack resistance.

A small but growing number of cotton producers use chemicals for the control of insects and diseases. Many are working closely with research and extension workers, and receive considerable supervision and some financial aid. Most of the chemicals are applied with hand-operated equipment.

Increased use of chemicals for control of insects and disease is held back by several problems. Chemicals are expensive, because domestic production is very limited, and because imported chemicals are subjected to import charges of up to 44 percent. Also, many farmers and some research workers believe that the application of chemicals to the low-yielding varieties that are growing in many areas will not increase profits significantly.

Considerable research is going on in an attempt to develop high-yielding cotton varieties that are resistant to the more serious insects and diseases, and that at the

same time have desirable fiber characteristics. Several of the varieties now in use have a fairly high degree of resistance to the jassid, but yields are relatively low and the fiber is not as long as desired. While the development of resistant varieties has long-range possibilities, India's critical need for increased cotton yields has accentuated the drive for increased use of chemicals and other control measures.

Credit.—Most Indian growers use credit for production of cotton. Recent data are unavailable, but a survey that was completed in 1951 showed that about 90 percent of the credit for agricultural purposes came from private sources. The share of credit supplied by selected sources for short- and long-term agricultural purposes is shown below:

	Short-term percent	Long-term percent
Agricultural money lenders and landlords	36	42
Professional money lenders, traders, and commission agents	35	32
Cooperatives	11	2
Government	3	6
Other	15	18
Total	100	100

In recent years, there has been a rapid increase in the number and membership of cooperative credit societies; they now supply considerably more credit than is indicated in the above table. Rates of interest charged by cooperatives range from less than 4 percent to more than 12 percent. These rates are substantially lower than the rates of 25 percent to 70 percent that may be

charged by private lenders. However, many cooperatives have not been dependable sources of credit because of inadequate funds, slow service, and low individual loan limits. In addition, cooperatives generally require collateral.

Although the interest charge is high, private money lenders generally require no collateral, there is no waiting period, and there are no formal debt papers. Frequently, there is no fixed repayment period. In many cases, cotton buyers lend money at no stated interest to prospective customers. This is really a form of advance payment because the farmer is expected to sell his cotton to his creditor. Often in such instances, the farmer receives less than the current market price for his cotton. In some areas, gin owners who also are merchants finance cotton production to an important extent.

Types and varieties

Virtually all of the cotton grown in India originated from *Gossypium arboreum* and *G. herbaceum* (Asiatic), and *G. hirsutum* (American). *G. arboreum* is indigenous to the Indian subcontinent. Present-day varieties generally have coarse fibers and extremely short staples. Such short-stapled cotton is produced to some extent in most cotton areas of India. The second Asiatic type, *G. herbaceum*, was introduced from the Middle East. Cultivation is centered in the central and western parts of India. Fiber of varieties developed from this type is somewhat longer and finer than arboreum cotton. Varieties developed from the American type, hirsutum, are even longer and finer. Only relatively small quantities of cotton grown in India are longer than one inch.

Many improved varieties have been developed in re-



Unginned cotton is stored in village market square awaiting auction.

cent years. Varieties of arboreum and herbaceum have been crossed in several instances. Considerable work has been done toward development of hybrid varieties. In recent years, there have been many trial plantings of the Andrews variety of an extra-long staple barbadense cotton. Several hundred acres of this cotton were planted in Mysore, Kerala, Maharashtra, Madras, and Andhra Pradesh in 1964.

About four-fifths of India's cotton production is obtained from improved varieties of Asiatic and American-Upland types. Roughly one-fourth is American-Upland and virtually all of the remainder the two Asiatic types. Considerable improvement in fiber quality and staple length has occurred over the past several years. However, most of the crop is less than one inch in staple. In 1964, about 52 percent of India's production was $\frac{7}{8}$ inch or longer; in 1950-1954, 25 percent.

Development programs

National planning has been the policy of India's Government, and the First 5-Year Plan was started in April 1951. The target for cotton production by the end of the First 5-Year Plan was surpassed, according to trade estimates. (Trade estimates of cotton production are considered more accurate than official estimates.) Most of the increase during 1951-55 is attributable to increased area devoted to cotton. Production increases in the Second 5-Year Plan fell far short of the original target, but the revised goals were exceeded. Cotton acreage remained fairly stable, but yields rose.

For the Third 5-Year Plan, which ends with the 1965-66 season, the cotton production goal was set at 5.8 million bales. It is now expected at the end of this period actual production will be at least one-half million bales short of the goal. Nevertheless, preliminary figures for the Fourth Plan indicate that the goal for 1971 will be raised to about 6.4 million bales.

Table 3.—COTTON: Production in India by staple length, averages 1950-54 and 1955-59, annual 1960-64

Season ¹	$\frac{7}{8}$ -inch and longer	Above $\frac{11}{16}$ -inch, under $\frac{7}{8}$ -inch	$\frac{11}{16}$ -inch and below	Total
	1,000 bales ²	1,000 bales ²	1,000 bales ²	1,000 bales ²
Average:				
1950-54--	860	1,912	632	3,404
1955-59--	1,640	1,776	575	3,991
Annual:				
1960-----	1,760	2,222	648	4,630
1961-----	1,915	1,426	734	4,075
1962-----	2,793	1,519	588	4,900
1963-----	2,912	1,560	728	5,200
1964 ³ ----	2,531	1,797	572	4,900

¹ Beginning August 1. ² 480 pounds net. ³ Preliminary.
Source: Indian Central Cotton Committee.

The Indian Government has many long-range programs aimed at raising agricultural production. In 1952, the Community Development Program was organized to promote social and economic development in rural areas. Virtually all of rural India has been divided into "blocks". A typical block has about 100 villages. A number of administrative and technical officers are assigned to each. The officer most closely associated with the farmer is the "village level worker". He is usually a young man with the equivalent of a high school education and two years of additional training in agriculture, extension, and community development methods.

A newer program called the Intensive Agricultural District Program has been implemented in several areas in recent years. This "package program" embodies Ford Foundation's recommendations that pilot agricultural districts be set up to promote more efficient agricultural methods. In summary, the objectives of this program are to be achieved in each district through a concentrated effort to combine effectively all factors of production in the most naturally productive areas.

The major motivating force in the improvement of India's cotton industry has been the Indian Central Cotton Committee (ICCC). The ICCC was established in 1921 as an advisory body to state and national governments on matters related to the growing, marketing, and manufacture of Indian cotton. Funds for the operation of the Committee have been obtained from the assessment of Indian cotton consumed in textile mills, exported from India, and in the past several years, imported into India.

Much of the Committee's effort has been devoted to development and distribution of improved planting seed. For the most part, research work of this type has been carried out in cooperation with agricultural research stations in various states. The Committee has also worked toward the establishment of "one-variety" areas, control of cotton pests and diseases, and the establishment of regulated markets. Other achievements include the adoption of uniform grades and standards, and of measures which were designed to maintain varietal purity and to eliminate malpractices in marketing, ginning, and pressing.

In late 1964, the Indian Ministry of Food and Agriculture proposed a reorganization of the administration of India's agricultural research. If the plan is carried out as now proposed, the functions of the ICCC and a number of other committees and organizations will be transferred to a new organization under the overall direction of a governing body to be known as the Council of Agricultural and Food Research. Under the plan, a central advisory council, which would represent all states, would be set up to advise the government on general policy on agricultural research, development, and extension. This body would serve as the link between the states and the national government.

In the private sector, also, development efforts are under way. In an effort to encourage increased cotton production through higher yields, the Indian Cotton Mills Federation launched in 1965 ten projects of 1,000 acres each. Under the program, the federation has provided to the cultivators at subsidized prices improved planting seed, fertilizer, plant protection chemicals, and equipment. A technical staff helps the farmers to follow recommended practices. In addition, the federation has undertaken four plant protection campaigns to impress upon the farmers the importance of plant pest control.

Marketing and ginning

In India, cotton is nearly always sold before it is ginned. In many areas—more often where holdings are relatively small—the producer sells in the local village to a village merchant or to a traveling cotton dealer. In some locations, agents of gins also buy cotton in villages. In areas where holdings are relatively large, many producers sell their cotton in the local wholesale market (a larger one). In a few areas, appreciable quantities of cotton are sold through cooperatives.

Although the system of selling cotton in the local villages is convenient to the grower, most observers believe that it results in a serious financial loss. Too often the farmer lacks up-to-date market information on prices and, reportedly, some local merchants use unscrupulous methods such as weighing with inaccurate scales. The credit system may affect the farmers' returns, as well; many farmers are more or less committed to the sale of produce to the men who financed their crops. The price is often reduced considerably.

In the secondary markets, which are also assembly and distribution centers, cotton is placed in an open area reserved for this purpose. In some places, a part of a gin yard is used. Buyers here represent cotton firms, gins, and, to an increasing extent in recent years, textile mills. After the sales agreement has been made, the cotton is usually weighed at a local gin and ownership is transferred.

Prices in secondary markets are determined by auction, or by negotiations, open or secret. Overall, the greater part of India's cotton is sold through open auctions. In some markets, prices are negotiated between representatives of the buyer and of the seller, while in other markets a form of secret bidding is practiced. The price is settled secretly through a system of finger pressure signals that are given under a piece of cloth. Only a person who receives the bids knows the various offers.

In recent years, a pronounced change has been taking place in marketing, as the number of regulated cotton markets has increased notably. These markets, organized under state laws, are designed to facilitate improved marketing practices. Regulated markets are operated through a committee made up of growers, traders, and local officials. Advocates of the system say

that regulated markets are responsible for many economic and social benefits. In these markets, malpractices such as short weights and the addition of unauthorized charges have been eliminated. The open auction method of determining prices is now being used widely, and it is contended that marketing charges paid by the producer have been reduced substantially.

Some progress has been made in the development of cooperatives and the movement is becoming important in some cotton areas. A number of cooperative raw cotton markets have given the Indian cotton grower an alternative to the more common system still in effect, where the buyer often has considerable advantage over the seller. It is expected that in the future there will be more expansion by cooperative methods.

There are about 2,500 gins in India, but a considerable number are no longer in use, or are used only a part of the season. Nearly all are of the roller type. According to reports, about one-third of the roller gins have less than 10 units; more than one-half 10 to 40 units. About three-fourths of the roller gins have single roller stands, one-fourth double rollers. Virtually no gins have cleaning equipment. Also, more than one-third of the gins are over 50 years old. Many are in fairly good repair, but a large number have been allowed to deteriorate. Few gins have installed the more efficient roller equipment developed in the past several years.

There is a small, but slowly increasing, number of saw gins. For many years, there was a deep-seated prejudice against saw-ginned Indian cotton, on the part of many cotton textile mills. However, a small premium is now received for it, and there is mounting interest in saw-gin construction.

Another, small, part of the crop is ginned on hand "churka", "bardoli", or "sabarmothi" gins. This cotton is used in India's home industries.

In India, the cotton-pressing process is usually separate from the ginning operation. Even when the gin and press are under the same management, the cotton is often stored unpressed for a time. There are about 900 cotton pressing units in India. The dimensions of the Indian bale are not standard—most are 48 to 50 inches long, 16 to 20 inches wide, and 15 to 18 inches thick. The average weight is 400 pounds gross. This includes 8 pounds of tare. Indian cotton is compressed to an unusually high density of 35 to 40 pounds per cubic foot. Generally, the pressing is done in two steps. A specific quantity, by weight, of cotton is fed into the first unit, where the cotton is compressed into a low-density bale. Then it is moved, by means of a bale holder, to a second unit, where the bale is fully compressed and covered with jute and tied with flat steel hoops. Each bale is marked with numbers that identify the gin and press.

After the cotton is ginned and pressed, it is normally transported to consumption centers for use in textile

plants, or to export points. Transactions are made on the basis of a sample. The samples usually weigh 10 to 15 pounds and are generally drawn from about 2 percent of the bales purchased. To facilitate the uniform classing of cotton, a system of standard grades was developed by the East Indian Cotton Association for commercial transactions. The base grades, with their approximate U.S. equivalents, are:

<i>Indian</i>	<i>United States</i>
Extra Superfine	Strict Low Middling
Superfine	Low Middling Bright
Fine (base)	Low Middling
Fully Good	Strict Good Ordinary
Good	Good Ordinary

It is extremely difficult to make an exact comparison between roller-ginned Indian cotton and saw-ginned U.S. cotton. Indian cotton nearly always has considerably more leaf trash than U.S. cotton. There is also a slightly different commercial concept as to staple lengths in India and the United States. Usually, cotton classified commercially in India will be considered slightly longer than the same cotton when classified in the United States.

While a system of premiums and discounts helps to determine more exactly quality in the commercial centers, as yet no system has been adopted for grading individual lots of cotton in the villages or secondary markets. Therefore, there is little incentive for farmers to produce clean, high-quality cotton, because such cotton does not command a significantly higher price than the average then prevailing in the local market.

Recently, consideration has been given to developing a uniform grading system. Grading cotton on the basis of the purity of variety is a step toward a uniform grading system for the local market. Growers of specified pure varieties of improved types receive a premium for their cotton if the product meets the prescribed specifications of varietal purity and cleanliness. At present this system covers a relatively small part of the crop.

Prices

When the grades and staple lengths are considered, market prices of domestically produced cotton in India are among the highest in the world. Prices of Indian cotton are subject to official minimum and maximum prices. However, in recent years prices have been at the ceiling or near. In fact, ceilings have been exceeded in some cases by misrepresentation of qualities or by other methods. In early 1965, the Indian Cotton Mills Federation attempted a number of actions that were designed to eliminate these malpractices. Stocks at mills can now be limited, and the federation can check on the quantity and quality of cotton in the mill's inventory.

The upward pressure on prices seems likely to be-

come more serious under a chronic shortage of cotton and strong demand in retail markets for cotton goods. In the past few years, some individual producers and ginneries and many well-financed cooperatives have held cotton off the market for relatively short periods in an effort to get higher prices.

Production outlook

A sharp rise in cotton production in India during the next few years does not appear likely, although it is reasonable to look for a slow, fairly steady uptrend in yields and production. Substantial increases in acreage are not expected. Pressures of rising population on limited land areas make it imperative to raise present levels of food for the low-calorie diet of the average Indian.

In fact, cotton acreage in some areas may decline because of pressure from other crops, and also because a buildup of undesirable salts in some irrigated soils may make cotton production there unprofitable or even impossible. However, the loss of cotton acreage in those areas could be more than offset in other areas as irrigation systems are expanded, or in case profits from cotton rise relative to other cash crops.

Since more land for cotton is not indicated, higher average yield is India's main hope for increased cotton production. Yields can be raised to levels more nearly in line with those of other countries only if a number of extremely serious problems can be overcome.

A major problem is water. About 15 percent of India's cotton is now grown under irrigation and in some of these districts there is only enough for one or two applications a year. Even in many parts of the irrigated areas, high concentrations of salts in the water (and/or improper drainage) are reducing yields.

Low-yielding varieties are another problem; many varieties now used are not capable of producing high yields even under optimum conditions. On the other hand, high-yielding varieties of Upland cotton apparently cannot produce high yields under conditions presently prevailing in most areas.

Cultural practices limit yield advances. The typical Indian cotton farmer uses little organic or commercial fertilizer or none. Commercial fertilizer is expensive and the supply limited.

In cultivating the land with his traditional bullock power and equipment, the farmer is unable to maintain proper soil structure and fertility level for optimum crop production. However, the average field is too small for efficient mechanical cultivation. Insecticides are used on very few cotton farms. India produces only small quantities of insecticides, and prices of these are extremely high. Imports are discouraged by import charges ranging up to 44 percent. Indian cotton farmers must contend with the destructive jassid, in addition to most insects found in the United States.

Table 4.—COTTON: Official minimum and maximum prices, with discounts and premiums, for grades and staple lengths, by specific variety grown in India, 1965-66 season¹

Variety	Basic price		Basic quality and price ^{2 3} discounts and premiums for other qualities				Basic staple length and price ² discounts and premiums for other lengths						
	Min.	Max.	Fully Good	Fine, (Basis, w/one except.)	Super-fine	Extra Super-fine	$\frac{1}{16}$ "	$\frac{1}{32}$ "	Basis	Cents/ lb.	Cents/ lb.	$\frac{1}{16}$ "	$\frac{3}{32}$ "
Vidarbha M.P. Virnar	23.49	29.71	—38	basis	.38	.76	—1.24	— .67	$27\frac{3}{32}$	.67	1.24	—	—
Moglai Jarilla	21.21	27.37	—38	do.	.38	.76	— .86	— .29	$25\frac{3}{32}$	.57	1.24	—	—
Khandesh Virnar	24.16	31.07	—38	do.	.38	.76	—1.24	— .67	$7\frac{7}{8}$	.67	1.71	—	—
Digvijay "A"	27.80	35.25	—76	—38	basis	.38	—1.14	— .57	$7\frac{7}{8}$	1.05	1.62	—	—
Digvijay "B"	24.75	32.20	—38	basis	.38	.76	—	— .57	$13\frac{1}{16}$	.65	1.33	2.19	—
Punjab American 320F	24.59	30.80	—38	do.	.38	.76	—1.24	— .57	$27\frac{3}{32}$	.57	1.24	1.90	—
Punjab American H-14	25.31	33.35	—38	do.	.38	.76	—1.62	— .76	$7\frac{7}{8}$	1.05	1.71	2.38	—
Westerns	22.39	28.87	—38	do.	.38	.76	—1.24	— .57	$13\frac{1}{16}$	.57	1.24	1.90	—
Karunganni	25.04	32.01	—38	do.	.38	.76	—1.43	— .67	$7\frac{7}{8}$	.67	1.24	2.00	—
Dholeras	20.92	26.92	—38	do.	.38	.76	—1.43	— .67	$3\frac{3}{4}$	.57	1.14	—	—
Sanjay	22.93	28.39	—38	do.	.38	.76	—2.48	—1.51	$13\frac{1}{16}$	.67	1.43	—	—
Bengal Deshi ³	18.32	23.54	—66	do.	1.33	2.67	—	—	none	—	—	—	—
Oomras	19.66	24.24	—38	do.	.67	1.24	—1.05	— .57	$5\frac{7}{8}$	.57	1.24	—	—
Mathia and Mungari	18.70	23.73	—38	do.	.67	1.24	—	—	none	—	—	—	—
Buri American	27.29	33.19	—38	do.	.38	.76	—	— .57	$25\frac{3}{32}$	.67	1.33	—	—
L. 147	27.78	34.87	—38	do.	.38	.78	—	— .86	$15\frac{1}{16}$	.95	2.00	—	—
Gaurani 6 and 12	25.04	32.06	—38	do.	.38	.76	—1.33	— .76	$7\frac{7}{8}$	.57	1.24	—	—
AK 235 and 277	25.04	32.06	—38	do.	.38	.76	—1.33	— .76	$7\frac{7}{8}$	.57	1.24	—	—
Kalyan	21.64	28.31	—38	do.	.38	.76	—	— .38	$25\frac{3}{32}$	.57	1.14	1.81	—
Jayadhar	25.12	32.33	—38	do.	.38	.76	—1.24	— .67	$7\frac{7}{8}$	.57	1.24	—	—
Laxmi	27.59	34.66	—38	do.	.38	.76	—1.81	—1.05	$25\frac{3}{32}$	.67	1.33	2.19	—
Cambodia "A"	33.88	41.52	—38	do.	.38	.76	—	—	$1\frac{1}{32}$	1.81	4.54	—	—
Cambodia "B"	29.76	37.10	—38	do.	.38	.76	—	— .86	1	2.67	4.82	7.47	—
Cambodia "C"	28.07	34.71	—38	do.	.38	.76	—1.43	— .76	$15\frac{1}{16}$	.86	1.81	2.76	—
I.S.C. 67	40.18	0	—95	do.	.95	1.90	—	—	$1\frac{1}{8}$	2.67	5.33	—	—
Sea Island (Andrews)	45.54	0	—95	do.	.95	1.90	—	—	$1\frac{3}{16}$	2.67	5.33	8.00	—

¹ For cotton delivered in full pressed bales, ex-sellers godown (warehouse), Bombay. Certain fees and allowances are included. Ceilings do not apply to cotton to be exported or to cotton that meets certain other requirements. Premiums are paid for saw-ginned cotton and for cotton that meets certain qualifications.

² Price for a particular quality and length is determined by using the base price and adding amount indicated for premium or subtracting for discount, in terms both of quality and length.

³ There is a discount of 1.33 cents per pound for Bengal Deshi that is graded "good".

Source: Government of India.

The small individual producer is therefore seen raising his cotton on farms of only a few acres, handicapped by the traditional methods of his forefathers. His lack of education is one of the most serious drawbacks to introduction of modern farming techniques. In addition to low rate of literacy, his access to information is handicapped by language problems, by the shortage of means of communications (such as radios) and by the serious shortage of adequately trained personnel willing to do educational work at the farm level.

To overcome these many obstacles to increased production of cotton as well as other crops, the Indian Government has started many programs and in addition has encouraged development of cooperatives. It is still too soon to judge the progress of many of these programs. However, it will certainly be at least several years before India's overall cotton production can be significantly increased. While with a favorable crop year it is possible the goal of six and three-fourths million bales planned by 1971 can be reached, this level cannot be predicted with any degree of certainty.

THE TEXTILE INDUSTRY

Cotton consumption

From the beginning of recorded history, the Indian subcontinent has been famous for production and consumption of cotton. There is conclusive evidence that domestic cotton fiber was being woven into cloth there at least 5,000 years ago. The Indian cotton textile industry has progressed much since those early beginnings; today the industry ranks among world leaders in terms of cotton consumption.

Aggregate cotton consumption—including relatively small quantities for nonmill use—has increased rather steadily for more than a decade, and reached about 5.5 million bales in 1964–65. This is about 25 percent larger than consumption in 1955–59, and 50 percent above the average of the 5 years before. Particularly in the past two or three years, domestic demand for textile goods in retail markets has been extremely strong. For the cotton textile industry, this has more than offset somewhat smaller exports of cotton textiles.

Increased textile activity has not been sufficient to prevent higher prices of textiles in retail markets, because of heavy pressure from the rising population and a considerable increase in supply of money in the hands of the buying public. Despite the relatively tight supply situation, the availability of cotton cloth for domestic consumption rose in 1964 to 16.5 linear yards per person, compared with 16.0 yards a year earlier. The availability of manmade fiber cloth also rose—to 1.4 yards per person in 1964, from 1.3 yards in 1963.

Industry organization

The Indian textile industry is usually considered in two sections. The larger is referred to as the "mill section", "mill industry", "commercial mills", or "centralized section," the smaller one as the "decentralized section".

Practically all of the spinning is done in the centralized section of the Indian textile industry, although

some hand spinning is practiced in nearly every part of the nation. For many years, the Government of India encouraged the development of hand spinning and weaving (the "cottage industry" advocated by Gandhi) as a means of increasing employment in homes and villages. However, with regard to hand spinning, efforts have not been successful and there has been little impact on the overall textile industry. Annual consumption of commercial cotton in this respect, under directions of the Khadi Board, including cotton used on the Ambar Charkha (an improved multiple hand spinning device) and for surgical dressings, has been estimated at only about 65,000 bales. In addition, a survey conducted many years ago indicated that about 220,000 bales of noncommercial cotton were used annually for padding and hand spinning.

Much of the cotton spun in the centralized section then goes to looms in the same mill or to other mills in the centralized section. However, a substantial quantity

Table 5.—INDIAN COTTON YARN AND FABRIC: Production in mill section and in decentralized section, annual 1955-64

Year ¹	Yarn ²	Fabric		
		Mill section	Decentralized section	Total
	<i>Mil. lb.</i>	<i>Mil. yd.³</i>	<i>Mil. yd.³</i>	<i>Mil. yd.³</i>
1955-----	1,630	5,094	1,771	6,865
1956-----	1,671	5,307	1,819	7,126
1957-----	1,780	5,317	1,981	7,298
1958-----	1,685	4,927	2,151	7,078
1959-----	1,723	4,925	2,270	7,195
1960-----	1,737	5,048	2,202	7,250
1961-----	1,901	5,141	2,595	7,736
1962-----	1,895	4,987	2,638	7,625
1963-----	1,968	4,837	3,146	7,983
1964-----	2,127	5,089	3,348	8,437

¹ Beginning January 1.

² Mill section.

³ Millions of linear yards.

Source: Office of the Textile Commissioner, Bombay.

goes to operators of units made up of a few power looms each in the decentralized section or to the hand looms. Although development of hand spinning has met with relatively little success, the number of decentralized power looms has increased rapidly in recent years, and this part of the section has become economically and politically viable. While the centralized section is subject to a wide range of controls and taxes, these obstacles are escaped to a large extent by the smaller decentralized section. Hand weaving continues to be a substantial industry under government encouragement.

Textile capacity

In terms of employment, the textile industry is the largest in India. Nearly a million persons are employed in the centralized textile mill section, and several million in the decentralized. In addition to employment, the textile industry contributes substantial amounts of foreign exchange to the economy.

About 550 textile mills comprised the centralized section in 1965. About 260 installations spin-only; the remainder operate both spindles and looms. All of the larger weaving mills also spin yarn.

Nearly two-thirds of all mills have less than 30,000 spindles each. This group comprises about one-third of the nation's spinning capacity. On the other end of the scale, 3 percent of the mills have over 100,000 spindles each. This group accounts for 16 percent of spinning capacity. In general, the composite mills have larger spinning capacity than the plants that spin only.

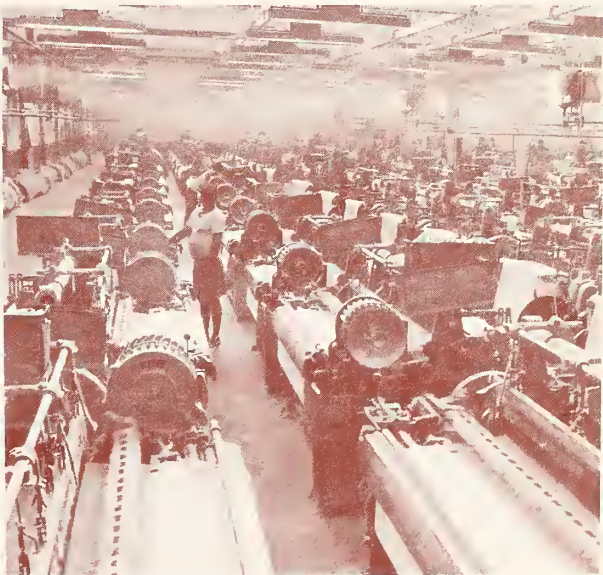
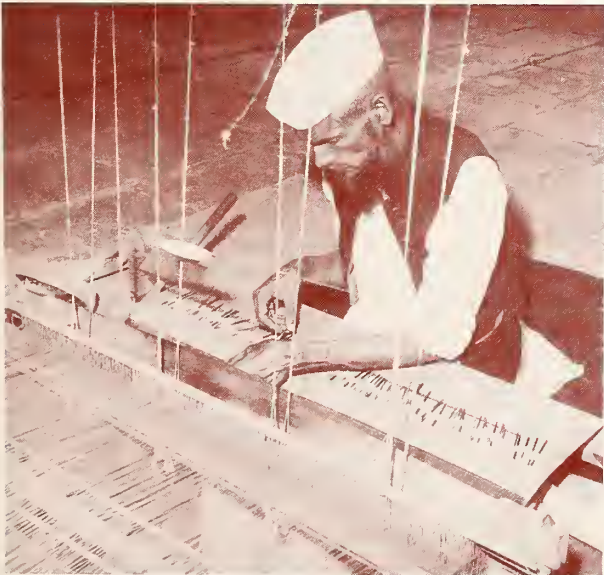
Weaving is a large scale industry. About three-fifths

of the plants have more than 500 looms each and account for over four-fifths of the centralized weaving capacity. Few firms have less than 100 looms. Mill capacity in the centralized section has been as follows:

<i>In place Jan. 1</i>	<i>Spindles 1,000</i>	<i>Looms 1,000</i>
1956	12,051	203
1957	12,492	201
1958	13,054	201
1959	13,406	201
1960	13,550	200
1961	13,663	199
1962	13,833	199
1963	14,117	200
1964	14,661	203
1965	15,310	205

In addition, there are more than 100,000 power looms and 3 million hand looms in operation throughout India, as part of the decentralized section. These power looms are usually old ones that have been sold by mills and are operated in small units.

After showing only a slow increase in capacity for several years, the industry began to install equipment more rapidly after the government's decision in the fall of 1963 to allow mills to expand. All mills were allowed to increase spindles by at least 7½ percent, and some expansion in the number of looms was authorized. More use is also being made of three-shift operations. In India, mills generally operate 6 days a week. About three-fourths of the mills operate three shifts a day in the spinning department, and about one-half



Ancient and modern methods of weaving are shown; at left, a handloom, common throughout India; and at right, one of the nation's largest and most modern weaving installations.

work three shifts in the weaving department. About 10 percent of India's looms are now automatic, and it is expected that this proportion will increase in the next few years.

Though some mills have modern equipment, most of the Indian textile machinery is outdated. Two-thirds of the spindles and more than one-half of the looms were installed before World War II. Output of cloth per textile worker is extremely low—only about one-tenth of the normal production in the United States. The industry is moving toward more efficient operations, but progress is slowed by the inability to make a wholesale replacement of a substantial part of the nation's textile machinery.

Centralized textile activity is located in practically all of the states of India. Nevertheless, the industry is concentrated heavily in a few states, as shown below for the 1963–64 season:

State	Spindles Percent	Looms Percent	Cotton Consumption Percent
Maharashtra, including Bombay	29	39	28
Gujarat	21	28	18
Madras	23	4	17
Uttar Pradesh	6	7	8
Other	21	22	29
Total	100	100	100

India's hand looms are scattered throughout the nation. However, there are more than 500,000 in the states of Assam, Madras, and Andhra Pradesh, while Uttar Pradesh and Manipur have more than 200,000 hand looms each.

Textile production

Cotton yarn production began to move considerably higher in 1963 (practically all of this in the commercial mill section) after several years of a fairly slow uptrend. In 1964, yarn output exceeded 2 billion pounds for the first time. Much of the rise in yarn production in recent years can be credited to the increased use of 3-shift operation, though additional spindles have also increased the uptrend sharply.

Despite increased yarn production, fabric output in the mill section has remained static for more than a decade. The increased yarn output was absorbed in the decentralized mill section. Expansion in the mill section has been controlled, and production of certain types of fabrics prohibited. Also, this section of the industry has been required to pay heavy excise duties and income and social security taxes from which the decentralized sector is exempt. In October 1964, the mill industry's system of voluntary price ceilings was replaced by government price controls. About one-half of the industry's

output is now under the price ceilings. Mills are required to produce specific quantities of the more popular fabrics that are under control. The types of fabrics that were produced in the mill industry in 1963 are:

Type	Percent of production
Coarse:	
16s and under	18
Medium:	
17 _s - 34 _s	71
Fine:	
35 _s - 47 _s	5
Superfine:	
48 _s and over	6
Total	100

While total mill output of cloth has remained stagnant, fabric production in the decentralized section has risen sharply in the past ten years. This section now accounts for two-fifths of total fabric production. Output is centered in saris, dhotis, towels, and shirting.

It is not now customary for the Indian consumer to buy ready-made goods. Saris and dhotis, the traditional Indian costume, are simply long lengths of cloth. However, a market for ready-made clothing appears to be developing, especially in Bombay and a few other points. Ready-made shirts seem to be the most popular item and ready-made trousers second. For the most part, however, cloth is purchased from small retailers and the costume is then custom-made.

Production of manmade fiber has increased rapidly in India, and by 1963 the output of these types of fibers equaled about 8 percent of cotton consumption. In 1964, manmade fiber production reached the equivalent of nearly one-half million bales of cotton, compared with an average of 24,000 bales in the 1950–54 period. Rayon accounted for virtually all the change, although production of noncellulosics has risen in recent years:

	Rayon 1,000 bales ¹	Other manmades 1,000 bales ¹
Average:		
1951-54	24	0
1955-59	138	0
Annual:		
1960	254	0
1961	294	0
1962	361	2
1963	414	6
1964	483	9

¹ Manmade fibers were converted to equivalent bales of cotton on the basis of various conversion factors that accounted for differences in waste, in the weight of the product, and in the end-use of the product.

Outlook

The prospect of increased use of fibers—especially cotton—is the brightest part of the Indian textile industry. The population is increasing rapidly, more money is reaching the hands of the general public, present per capita use of textiles is low, and Indians in general seem eager to enlarge their wardrobes.

Of course, the outlook is not entirely favorable. Supplies of textile raw materials and production capacity must be increased, and retail prices of textiles must remain attractive to prospective buyers. Retail prices have risen somewhat in recent years, though the rise was held down somewhat by controls, and to a considerable extent the rise is a reflection of the inflation that is becoming more noticeable in India. Domestic production of textile equipment is not sufficient to fill requirements. Imports of textile machinery are tied through license requirements to exports of textiles. This trade has moved downward in recent years.

A provisional goal of about 11 billion yards of cotton fabric has been set for the textile industry to achieve by the end of the Fourth 5-Year Plan in 1971. About 6 billion yards of this target quantity are to be produced by the mill industry and the other 5 billion by the decentralized section. Therefore, output in the mills is expected to rise 18 percent by 1971, from 1964 production of 5.1 billion yards while for that of the decentralized section a rise of more than 50 percent is planned. Although the planned increase in cotton textile output is substantial, it is equivalent to only about 2 yards of additional cloth per person for the expected 1971 population.

To facilitate production of the yarn that will be needed for India's planned fabric requirements, the government is expected to authorize an increase in spindles to over 19 million by 1971. Probably 2 million

to 3 million spindles that are now in place will be modernized or replaced as well. Also, the mill industry is to be allowed to increase looms to about 230,000. A considerable number of the additional looms may be automatic.

It is estimated that more than 6.5 million bales of cotton will be required to produce the 11 billion yards of fabrics projected for 1971. Nonmill consumption of cotton in 1971 is carried at 275,000 bales. Therefore, annual cotton consumption, by 1971, is expected to approach 7 million bales, compared with about 5.5 million in 1964. This goal may be achieved, but only if increased capacity is made available to the industry, and if adequate supplies of cotton are available.

Production of manmade fibers will probably rise over the next several years, and some types of cotton yarn will face intense competition from these fibers. However, replacement of substantial quantities of cotton with manmade fibers is not expected. In general, spokesmen for the cotton textile industry have shown little interest in the use of manmade fiber. However, in the mill sector, some spin yarn from a relatively small quantity of manmade fiber; a few mills also produce fabrics from a blend of cotton and other fibers. In the decentralized section, there is now used a considerable quantity of continuous filament fiber, and this section might increase use of manmades over the next few years.

Manufactures of rayon now depend heavily upon imports of pulp for their operations, but some pulp production has been developed in the past two or three years. Reportedly, much of the pulp that has been produced thus far was not suitable for viscose rayon. Additional capacity for the manufacture of nylon and other manmade fibers is now under way, but the additional overall effect on the textile industry is not expected to be great within the near future.

FOREIGN TRADE

Cotton imports

India imports sizable quantities of cotton to meet domestic requirements for consumption to which domestic production is inadequate. In most recent years, cotton has been one of the two major agricultural imports and has ranged from about 500,000 to 900,000 bales. Traditionally, the United States has supplied the largest quantity. In recent years, most of this has entered India under Public Law 480 arrangements. This has enabled India to save sizable sums of foreign exchange.

For the most part, Indian interest in U.S. cotton is centered on high-quality Upland with a staple length of $1\frac{1}{16}$ inches or longer. Substantial quantities of relatively long-stapled Upland cotton are obtained from East

Africa, as well, while Pakistan sometimes supplies a considerable volume of cotton about one inch in staple length. Egypt and Sudan provide India with nearly all of the extra-long staple cotton that is required in the manufacture of India's high-count yarns. Most of the cotton that is obtained from countries other than the United States is imported under bilateral trade agreements.

The Government of India uses a quota system to restrict imports of cotton by source and type. A letter, which is issued by the Indian Textile Commission, is required for all cotton imports. On the basis of the letter, an import license is issued by the office of the Joint Chief Controller of Imports and Exports, Bombay. Licenses are issued to mills on the following bases:

Table 6.—COTTON: Imports into India by country of origin, averages 1950-54 and 1955-59, annual 1960-64¹

Origin	Average ²		1960	1961	1962	1963	1964 ³
	1950-54	1955-59					
	1,000 bales ⁴	1,000 bales ⁴	1,000 bales ⁴	1,000 bales ⁴	1,000 bales ⁴	1,000 bales ⁴	1,000 bales ⁴
United States -----	271	155	574	243	332	224	272
Egypt -----	177	101	86	76	116	133	136
Sudan -----	58	86	78	135	163	111	83
British East Africa ⁵ -----	176	138	136	129	57	62	90
Peru -----	5	4	(⁶)	1	1	11	25
Aden -----	(⁶)	2	5	6	8	9	7
Pakistan -----	1	9	3	63	63	(⁶)	47
Other countries -----	4	3	25	16	6	6	8
Total -----	692	498	907	669	746	556	668

¹ Seasons beginning August 1.

² Figures for some countries are less than 5-year averages.

³ Preliminary.

⁴ 480 pounds net.

⁵ Includes Uganda, Tanzania, and Kenya.

⁶ Less than 500 bales.

Source: *Accounts Relating to the Foreign (Sea, and Land) Trade and Navigation of India; Monthly Statistics of the Foreign Trade of India*; U.S. agricultural attaches and other representatives abroad.

(1) the mill's history of previous foreign cotton consumption, (2) the mill's exports of cotton textiles, and (3) defense requirements. A fee, to be used to subsidize cotton textiles, is collected by the Indian Cotton Mills Federation from each mill that imports cotton. The fee is waived on the cotton content of exported textiles. Mills that receive licenses to import cotton because of their export performance can sell the licenses to other mills if the original does not use the right. In early 1965, the Federation reduced the fees to the following amounts:

Staple lengths	Cents per pound
1 $\frac{3}{16}$ " and over -----	10.45
1 $\frac{1}{16}$ " to 1 $\frac{3}{16}$ ", barter -----	4.45
1 $\frac{1}{16}$ " to 1 $\frac{3}{16}$ ", non-barter -----	5.23
Under 1 $\frac{1}{16}$ " -----	0

There are a number of other import charges on cotton entering India. Since March 1963, there has been a customs duty on imported cotton, amounting to approximately 1.06 cents per pound. In February 1965, a temporary special ad valorem duty of 10 percent was imposed on cotton and nearly all other imports into India. Beginning in April 1965, cotton imported into Bombay was subject to a 5 percent surcharge on dock, bunder, dry dock, and port charges. In addition to the above charges, cotton produced in the Western Hemisphere must be fumigated at a cost of about 0.33 cents per pound.

Since it does not appear likely that within the foreseeable future India's cotton production will match consumption, imports will continue to be important to the Indian mill industry. In fact, India's cotton import

requirements may increase in view of the rapid rise in domestic needs which tend to outrun the rise in domestic cotton production. However, it seems unlikely that India's foreign exchange reserves will, for at least several years, improve to the point where all of the nation's cotton purchases will be financed with hard currency.

Cotton exports

Although India uses considerably more cotton than it produces domestically, sizable quantities of short, harsh Desi cotton and small quantities of Comilla, Zoda, and yellow pickings are exported annually. Practically all production of these types is exported; more than three-fourths is usually shipped to Japan. In Japan, this type of cotton is used for padding and sanitary material; in other countries, frequently, in mixtures for the manufacture of blankets. Total exports from India have averaged about 250,000 bales annually in the 1960-64 period, compared with over 300,000 in the previous 5-year period.

India earns considerable foreign exchange from exports of short, harsh cotton, and many government and industry officials have expressed the desire that Indian production of this type of cotton be increased to allow exports comparable to earlier years. Nevertheless, yields are very low and farm profit relationships have encouraged a shift in acreage toward other types. At the same time, the Japanese market for short, harsh cotton is under pressure from manmade fiber and polyurethane foam. According to reports, Japan's shift to raw materials other than cotton has been speeded up by the somewhat reduced production of Desi cotton, and by cotton

Table 7.—COTTON: Exports from India of cotton by country of destination, averages 1950-54 and 1955-59, annual 1960-64¹

Destination	Average ²		1960	1961	1962	1963	1964 ³
	1950-54	1955-59					
	1,000 bales ⁴	1,000 bales ⁴	1,000 bales ⁴	1,000 bales ⁴	1,000 bales ⁴	1,000 bales ⁴	1,000 bales ⁴
Japan -----	80	199	186	189	236	179	158
United States -----	26	10	5	20	11	15	18
France -----	10	10	9	8	13	13	8
Hong Kong -----	1	24	13	11	8	8	6
United Kingdom -----	19	19	4	4	6	5	3
Belgium & Luxembourg ----	7	9	2	1	1	3	1
Germany, West -----	8	4	3	(⁵)	1	3	(⁵)
Italy -----	5	7	1	3	4	2	2
Netherlands -----	10	4	(⁵)	2	1	2	1
Other countries -----	8	23	1	15	6	1	5
Total -----	174	309	224	253	287	231	202

¹ Seasons beginning August 1.

² Figures for some countries are less than 5-year averages.

³ Preliminary.

⁴ 480 pounds net.

⁵ Less than 500 bales.

Source: *Accounts Relating to the Foreign (Sea, and Land) Trade and Navigation of India; Monthly Statistics of the Foreign Trade of India*; U.S. agricultural attaches and other representatives abroad.

prices that are considerably higher than in previous seasons. In 1964, India abolished the export duty and freed this type of cotton from the longstanding export quota system. This action offset a similar move by Pakistan, another major producer of Desi cotton, and made available for export the maximum quantity of this cotton. Exports of other types of cotton from India are prohibited because of the need for raw cotton in the domestic textile industry.

Textile exports

Exports of cotton textiles have fallen gradually over the past several years, although these shipments still represent a major source of India's foreign exchange. The United Kingdom normally takes about one-fourth of India's exports. Large shipments go also to the United States, East Africa, Sudan, Australia, and a number of other countries. Exports of manmade fiber textiles account for a relatively small, but growing, part of India's textile export trade. In 1962, for the first time, shipments exceeded 100 million square yards, compared with an average of only 6 million yards in the 1951-54 period.

In manmades, Malaysia, Ceylon, and Afghanistan normally purchase a substantial part of India's exports; Aden, Sudan, and a number of other countries take smaller quantities.

The outlook is not particularly bright for large increases in exports of cotton and manmade fiber textiles, though foreign sales of certain madeup garments have been strong in recent years. Shipments of most items

are now profitable only when subsidized through various methods by the Indian Government. Even though demand in the more profitable home market is relatively certain to continue strong, the government is likely to continue to encourage textile exports because this source of foreign exchange is vital. However, Indian textile exports will find increasing competition in many of the nation's textile markets. Textile imports will be reduced in some of India's traditional markets as those nations develop domestic textile industries. Also, there will be stronger competition in many textile import markets because a number of countries are looking for new markets for their increased output or for new destinations to replace lost markets.

Textile imports

India imports small quantities of textiles to supplement domestic production. In fact, even these relatively insignificant imports have declined sharply in recent years. For example, imports of cotton piece goods fell below 1 million square yards in 1963, compared with average shipments of nearly 10 million yards in the 5-year period 1955-59. Imports of manmade fiber piece goods fell even more sharply—to only 200,000 square yards in 1963, from 8 million yards in the earlier period. It does not seem likely that textile imports will expand significantly within the next several years, in view of India's critical shortage of foreign exchange, and because of the government's strict control of imports. Also, the Indian textile industry now produces a wider range of goods than formerly.

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Table 8.—COTTON TEXTILES: Exports from India by country of destination, averages 1950-54 and 1955-59, annual 1960-64¹

Destination	Average ²		1960	1961	1962	1963	1964 ³
	1950-54	1955-59					
<i>Piece goods</i>	<i>Mil. sq. yd.</i>	<i>Mil. sq. yd.</i>	<i>Mil. sq. yd.</i>	<i>Mil. sq. yd.</i>	<i>Mil. sq. yd.</i>	<i>Mil. sq. yd.</i>	<i>Mil. sq. yd.</i>
United Kingdom	54	143	238	154	160	187	176
United States	0	11	42	11	42	56	30
British East Africa ⁴	62	76	58	69	53	55	34
Sudan	63	109	77	68	79	43	22
Australia	40	55	58	29	35	34	24
Ceylon	58	41	29	28	20	27	28
Afghanistan	33	18	27	29	17	26	24
Canada	0	19	24	22	26	24	15
Aden	72	49	37	31	24	22	15
Singapore	132	34	28	21	15	20	7
Burma	82	26	27	11	7	20	2
New Zealand	7	12	16	13	13	14	10
Malaya	23	17	20	15	13	14	12
Saudia Arabia	0	18	16	15	12	13	8
Other	364	293	169	181	127	122	137
Total	990	921	866	697	643	677	544
<i>Yarn</i>	<i>Mil. lb.</i>	<i>Mil. lb.</i>	<i>Mil. lb.</i>	<i>Mil. lb.</i>	<i>Mil. lb.</i>	<i>Mil. lb.</i>	<i>Mil. lb.</i>
United Kingdom	3	3	5	2	6	10	11
British West Africa	(⁵)	1	2	4	4	5	4
Hong Kong	10	4	1	1	(⁵)	4	1
Ceylon	(⁵)	1	2	2	3	4	3
Burma	3	3	2	(⁵)	1	1	(⁵)
Other	15	9	3	7	9	6	7
Total	31	21	15	16	23	30	26

¹ Year beginning January 1.

² In some years, does not include trade with Pakistan.

³ January-November only.

⁴ Kenya and Tanzania in 1951-54; Uganda included in other years.

⁵ Less than 500,000 pounds.

Source: Cotton Board Quarterly Statistical Review.